In the Claims

1. (Original) An electronic sheet material dispenser comprising:

- a housing defining a space enclosing at least one sheet material roll;
- an input device structured to obtain a user request;
- a dispensing mechanism including a drive roller and a motor in power-transmission relationship with the drive roller;
- a power source powering the motor and having a power source output; and
- control apparatus controlling operation of the dispenser, said control apparatus being structured to:
  - power the motor for a predetermined time in response to the user request;
  - obtain a power source output value during at least a portion of the predetermined time;
  - de-power the motor upon completion of the predetermined time; and
  - determine a time duration for powering the motor in the next dispense cycle based at least in part on the power source output value.

2. (Original) The dispenser of claim 1 wherein the input device comprises a proximity sensor structured to detect a user's presence adjacent the housing.

3. (Original) The dispenser of claim 2 wherein the proximity sensor comprises a capacitive sensor having a capacitance which is changed by the user's presence within a detection zone projecting outwardly from the dispenser.

4. (Original) The dispenser of claim 3 wherein the dispenser further includes a signal detection circuit operatively connected to the capacitive sensor for detecting the capacitance change.

5. (Original) The dispenser of claim 4 wherein the signal detection circuit includes:

- an oscillator having a frequency which is affected by the sensor capacitance; and
- a differential frequency discriminator which detects changes in the oscillator frequency, said detection being obtained by the control apparatus to control dispenser operation.

6. (Original) The dispenser of claim 5 wherein the differential frequency discriminator includes:

- a signal conditioning circuit configured to produce: (1) a first series of pulses, each pulse being of fixed duration and the series of pulses having a frequency corresponding to the oscillator frequency; and (2) a second series of pulses, such second series being the complement of the first series;
- a first averaging circuit outputting a first average, such first average being the average of the first series of pulses;
- a second averaging circuit outputting a second average, such second average being the average of the second series of pulses; and
- a first comparator which compares the first average and the second average and produces an output which is a discriminator difference multiplied by a gain factor of the first comparator, such discriminator difference being the difference between the second average and the first average, and such output corresponds to the presence of the user within the detection zone.

7. (Original) The dispenser of claim 6 wherein the differential frequency discriminator further includes a set point circuit which sets the discriminator difference substantially to zero when the user is not present in the detection zone.

8. (Original) The dispenser of claim 7 wherein the signal conditioning circuit includes a monostable multivibrator and the multivibrator is operative to generate the first and second series of pulses.

9. (Original) The dispenser of claim 1 wherein the input device is a contact switch structured to respond to contact by the user.

10. (Original) The dispenser of claim 1 wherein the power source comprises at least one battery.

11. (Original) The dispenser of claim 10 wherein the power source output is a voltage.

12. (Original) The dispenser of claim 10 further including an audible sound generator structured to emit a sound in response to a low battery condition.

13. (Original) The dispenser of claim 1 wherein the control apparatus includes a processor having a memory including instructions adapted to:

- power the motor for the predetermined time in response to the user request;
- obtain the power source output value during at least a portion of the predetermined time;
- de-power the motor upon completion of the predetermined time; and
- determine the time duration for powering the motor in the next dispense cycle based at least in part on the power source output value.

14. (Currently Amended) The dispenser of claim 13 wherein the processor instructions are further adapted to:

- store a first value based at least in part on a power source output value during powering of the motor in a preceding dispense cycle;
- generate a second value based on an average of the first value and the power source output value during powering of the motor in the then-occurring dispense cycle; ~~and~~
- store the second value in place of the first value; and
- determine the time duration for powering the motor in the next dispense cycle based at least in part on the second value.

15. (Original) The dispenser of claim 14 wherein the processor instructions are further adapted to determine, relative to the then-occurring dispense cycle, the time duration for powering the motor in the next dispense cycle such that:

- the time duration is increased or not changed if the second value is less than the first value;
- the time duration is decreased or not changed if the second value is greater than the first value; and
- the time duration is not changed if the second value is identical to the first value.

16. (Original) The dispenser of claim 13 wherein:

- the control apparatus further includes a low battery indicator;
- the processor further includes a low battery counter; and
- the processor instructions are further adapted to:
  - obtain a power source output value when the motor is de-powered;
  - determine whether the power source output value is below a threshold when the motor is de-powered; and
  - power the low battery indicator if the power source output value is below the threshold.

17. (Original) The dispenser of claim 13 wherein:

- the control apparatus further includes a low battery indicator;
- the processor further includes a low battery counter; and
- the processor instructions are further adapted to:
  - increment a count for each dispense cycle in which the power source output value is below a low battery threshold;
  - decrement a count for each dispense cycle in which the power source output value is above the low battery threshold; and
  - power the low battery indicator when incremented counts exceed decremented counts by a predetermined number.

18. (Original) The dispenser of claim 17 wherein the low battery indicator is an audible sound generator and the generator emits an audible sound when powered.

19. (Original) The dispenser of claim 13 wherein the processor further includes a lock-out counter and the processor instructions are further adapted to:

- increment a count for each dispense cycle in which the power source output value is below a lock-out threshold;
- decrement a count for each dispense cycle in which the power source output value is above the lock-out threshold; and
- lock out further powering of the motor when incremented counts exceed decremented counts by a predetermined number.

20. (Original) A sheet material dispenser for dispensing a length of sheet material during a dispense cycle comprising:

- a housing defining a space enclosing at least one sheet material roll;
- a proximity sensor structured to generate a dispense signal responsive to a user request;
- a dispensing mechanism including a drive roller and a motor in power-transmission relationship with the drive roller;
- a power source powering the motor and having a power source output; and
- control apparatus structured to control the length of sheet material dispensed during at least a then-occurring dispense cycle, said control apparatus including a micro-controller having a memory including instructions adapted to:
  - store a first value corresponding at least in part to a power source output value during powering of the motor in a preceding dispense cycle;
  - obtain the dispense signal in the then-occurring dispense cycle;
  - power the motor for a predetermined time in the then-occurring dispense cycle responsive to the dispense signal and based at least in part on the first value;
  - obtain a power source output value during at least a portion of the predetermined time;
  - generate a second value based on an average of the first value and the obtained power source output value;
  - store the second value in place of the first value; and

- de-power the motor upon completion of the predetermined time.

21. (Original) The dispenser of claim 20 wherein the micro-controller instructions are further adapted to determine, relative to the then-occurring dispense cycle, a time duration for powering the motor in a next dispense cycle such that:

- the time duration for powering the motor is increased or not changed if the second value is less than the first value;
- the time duration for powering the motor is decreased or not changed if the second value is greater than the first value; and
- the time duration for powering the motor is not changed if the second value is identical to the first value.

22. (Original) The dispenser of claim 20 wherein:

- the control apparatus further includes a low battery indicator;
- the micro-controller further includes a low battery counter; and
- the instructions are further adapted to:
  - obtain a power source output value when the motor is de-powered;
  - determine whether the power source output value is below a threshold when the motor is de-powered; and
  - power the low battery indicator if the power source output value is below the threshold.

23. (Original) The dispenser of claim 22 wherein:

- the control apparatus further includes a low battery indicator;
- the micro-controller further includes a low battery counter; and
- the instructions are further adapted to:
    - increment a count for each dispense cycle in which the power source output value is below a low battery threshold;
    - decrement a count for each dispense cycle in which the power source output value is above the low battery threshold; and
    - power the low battery indicator when incremented counts exceed decremented counts by a predetermined number.

24. (Original) The dispenser of claim 23 wherein the low battery indicator is an audible sound generator and the generator emits an audible sound when powered.

25. (Original) The dispenser of claim 23 wherein the micro-controller further includes a lock-out counter and the instructions are further adapted to:

- increment a count for each dispense cycle in which the power source output value is below a lock-out threshold;
- decrement a count for each dispense cycle in which the power source output value is above the lock-out threshold; and
- lock out further powering of the motor when incremented counts exceed decremented counts by a predetermined number.

26. (Original) The dispenser of claim 20 wherein the power source comprises at least one battery.

27. (Original) A method for dispensing sheet material with a sheet material dispenser comprising:

- initiating a dispense cycle in response to a user request;
- powering a motor with a power source for a predetermined time duration, said motor structured to power a dispensing mechanism to dispense a length of sheet material from the dispenser;
- obtaining a power source output value during at least a portion of the predetermined time duration;
- de-powering the motor upon completion of the predetermined time duration; and
- determining a time duration for a next dispense cycle based at least in part on the power source output value.

28. (Currently Amended) The method of claim 27 wherein the dispense cycle is a first dispense cycle, the next dispense cycle is a second dispense cycle and the method further comprises:

- initiating the second dispense cycle in response to a user request;
- powering the motor with the ~~electrical~~ power source for the determined time duration, said motor powering the dispensing mechanism to dispense a second length of sheet material having a length substantially the same as the length of sheet material dispensed in the first dispense cycle;
- obtaining a power source output value during at least a portion of the determined time duration of the second dispense cycle;
- de-powering the motor upon completion of the determined time duration; and
- determining a time duration for a next dispense cycle based at least in part on the power source output value obtained during the second dispense cycle.

29. (Original) The method of claim 27 wherein the initiating step comprises:

- sensing a user's presence with a proximity sensor; and
- initiating the dispense cycle responsive to sensing the user's presence.

30. (Original) The method of claim 29 wherein the sensing step comprises:

- detecting a change in proximity sensor capacitance within a sensor detection zone proximate the dispenser;
- generating a signal responsive to the change in proximity sensor capacitance;
- obtaining the signal with a micro-controller, said micro-controller causing the motor to be powered responsive to the signal.

31. (Original) The method of claim 27 wherein the step of obtaining a power source output value comprises measuring a power source voltage.

32. (Original) The method of claim 27 further comprising:

- storing a first value corresponding at least in part to a power source output value obtained during powering of the motor in a preceding dispense cycle;
- determining a second value based on an average of the first value and the power source output value obtained during powering of the motor in a then-occurring dispense cycle;
- storing the second value in place of the first value; and
- determining a time duration for a next dispense cycle based at least in part on the second value.

33. (Original) The method of claim 32 wherein the step of determining the time duration for the next dispense cycle comprises:

- increasing or not changing the time duration if the second value is less than the first value;
- decreasing or not changing the time duration if the second value is greater than the first value; and
- not changing the time duration if the second value is identical to the first value.

34. (Original) The method of claim 27 further comprising:

- obtaining a power source output value when the motor de-powered;
- determining whether the power source output value is below a threshold when the motor is de-powered; and
- powering a low battery indicator if the power source output value is below the threshold when the motor is de-powered.

35. (Original) The method of claim 27 further comprising:

- incrementing a count for each dispense cycle in which the obtained power source output value is below a low battery threshold;
- decrementing a count for each dispense cycle in which the obtained power source output value is above the low battery threshold; and
- powering a low battery indicator when incremented counts exceed decremented counts by a predetermined number.

36. (Original) The method of claim 35 wherein the step of powering a low battery indicator comprises powering an audible sound generator to emit an audible sound.

37. (Original) The method of claim 27 further comprising:

- incrementing a count for each dispense cycle in which the power source output value is below a lock-out threshold;
- decrementing a count for each dispense cycle in which the power source output value is above the lock-out threshold; and
- locking out further powering of the motor when incremented counts exceed decremented counts by a predetermined number.